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**Mother knows best:  
Maternal experience and  
choice of infant sleep position**

A Thesis Submitted to the  
Yale University School of Medicine  
In Partial Fulfillment of the Requirements for the  
Degree of Doctor of Medicine

by  
Meghan Brooks Lane  
2006 MD Candidate

## **MOTHER KNOWS BEST: MATERNAL EXPERIENCE AND CHOICE OF INFANT SLEEP POSITION**

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### **ABSTRACT:**

**Purpose:** The purpose of this project was to examine the associations between maternal child-rearing experience, choice of infant sleeping position, and the source, nature and trust of advice received about infant sleeping position in a high-risk, primarily African-American population.

**Background:** The number of deaths attributed to Sudden Infant Death Syndrome (SIDS) has decreased since the initiation of the Back to Sleep campaign in 1994. Although this change has benefited all ethnic groups, African-American infants are still twice as likely to succumb to SIDS as Caucasian infants.

**Design/Methods:** We conducted 668 face-to-face standardized interviews with mothers of infants in Connecticut, Georgia and Texas. Mothers were included in the interviews if they were the primary caregivers for an infant younger than eight months. Mothers with children aged 10 years or older and mothers of younger children were compared with regard to the following variables: sleep position with current infant, advice received about sleep position, sources of advice and trust in advice received. Univariate analysis was used to compare the two groups of mothers. Odds ratios and 95% CI were calculated to determine relationship between sleep position and maternal characteristics such as age, race and education.

**Results:** Mothers of older children differed from mothers with younger children in two ways. Women with children aged 10 or older were less likely to receive sleep position advice from their families than were women with younger children (12/87 or 14% versus 249/581 or 43%,  $p < 0.0001$ ). Of the multiparous women, mothers with older children were more likely than women with younger children to have placed a previous child in the prone position for sleep (55/87 or 63% versus 100/282 or 36%,  $p < 0.0001$ ). Having placed a previous child in the prone position has been found in other studies to be associated with an increased risk of placing the current infant in the prone position, and our data duplicate this finding. However, the mothers of older children in this sample were not found to use the prone position with the current infant more than mothers of younger children.

**Conclusions:** Mothers with children born before or near the initiation of the Back to Sleep campaign have different sources of advice about sleep position than women with younger children. They are also more likely to have placed a previous child in the prone position for sleep, and so may constitute a group whose children are at increased risk of SIDS.

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## INTRODUCTION

Sudden infant death syndrome (SIDS) is a clinical entity described as “the sudden death of an infant under one year of age, which remains unexplained after a thorough case investigation, including performance of a complete autopsy, examination of the death scene, and review of the clinical history (1).” SIDS was first described in 1969, when a significant number of infant deaths with unknown causes and similar characteristics prompted the generation of a syndrome definition that would guide research efforts and provide some solace to devastated family members (1). The recurring features present in most SIDS deaths at that time, and continuing up to the 1990s, include apparent occurrence during sleep, infant age between two and four months and increased likelihood during winter months (1-5).

Despite diagnostic and therapeutic advances and improving ability to recognize the causes of infant death, SIDS remains the leading cause of death of infants aged 1 to 12 months in the United States (2, 4-6). The pathophysiology of this syndrome is unclear. Some hypotheses implicate rebreathing of carbon dioxide (2), neuropathologic lesions (2), impaired protective airway reflexes, decreased arousability (7), sleep apnea or increased QT interval and decreased heart rate variability (6), yet no one explanation has emerged as the most likely etiology. As such, there are no definitively known causes of SIDS (5). Rather, there are factors found to be associated with an increased or decreased risk of this syndrome. Factors associated with increased risk include: bed sharing with infants\* (5, 8-11), maternal smoking during pregnancy (5), presence of stuffed animals or

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\* Studies of American infants find an increased risk of SIDS associated with bed sharing (5, 8-11). In other countries, such as Japan, bed sharing has been found to be protective against SIDS (9). The reason for this cultural/geographic discrepancy is unclear, but the type of bedding surfaces common in Japan (firm mattresses, no pillows) may negate the risk associated with bed sharing seen in Western countries (9).

soft bedding in the infant sleep area (4, 5), overheating (5), infant prematurity and low birth weight (5), and prone infant sleeping position<sup>\*</sup>, especially in infants not accustomed to the prone position (4, 5, 12). Conversely, supine infant sleep position (5), use of firm bedding, and use of pacifiers (4, 5, 7, 8, 13) have been found to be protective against SIDS. A review of all infant deaths in North Carolina from 1999 to 2000 revealed that at least one risk factor was present in 92.2% of SIDS deaths (6). When more than one risk factor is present, the risk of SIDS increases in a multiplicative fashion (4).

Of the factors associated with SIDS, sleep position is one of the most important predictors of whether an infant succumbs to this syndrome; the association persists when corrections are made for possible confounding factors (5). The association between prone sleep and sudden unexpected infant death was noted at least as early as 1944, when a pathologist recognized that the majority of infants dying from “mechanical suffocation” were found face down (14). SIDS is now thought to be distinct from suffocation, but sleep position has repeatedly and consistently been demonstrated to be a major underlying factor. The positive correlation between SIDS and stomach sleeping has been noted in a number of case-control studies (2, 3, 12). The side sleep position is now also recognized as a risk for SIDS (5), perhaps due to the possibility that the infant will roll from the side into a prone position (2, 4, 5, 12).

In recognition of the contribution of sleep position to SIDS risk, the American Academy of Pediatrics (AAP), a professional organization of pediatric physicians, issued a policy statement in 1992 advocating the use of the supine sleeping position to prevent

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<sup>\*</sup> In this paper, prone sleeping position refers to placing an infant to sleep with the abdomen down, closest to the sleeping surface, without regard to head position. Supine sleeping position refers to placing an infant to sleep with the back closest to the sleeping surface. Side sleeping position refers to placing an infant to sleep with either lateral aspect of the abdomen closest to the sleeping surface. “Prone” and “stomach” will be used interchangeably, as will “supine” and “back”, and “side” and “lateral”.

SIDS deaths (15). In 1994, a consortium of groups including the AAP and United States Public Health Task Force launched the “Back to Sleep” campaign to increase infant caregiver awareness about the increased SIDS risk associated with the prone sleeping position (4, 5, 7, 12, 16-20). These recommendations ran counter to the advice of physicians for decades that caregivers place infants to sleep on their stomachs to prevent aspiration (14).

As pediatricians began to recommend back sleeping, the National Infant Sleep Position (NISP) study was launched in 1992 to assess the prevalence of different infant sleeping positions (21). The NISP study started as a telephone survey of households with infants younger than 8 months, the age group at greatest risk of dying of SIDS. Infant age information was compiled from publicly available data (birth records, photography companies, infant formula companies), and households were randomly sampled from the list of eligible families (21). The households that participated were demographically dissimilar to the overall population, with Caucasian infants overrepresented. Young mothers, mothers with low educational attainment and people without telephones, who are more likely to be economically disadvantaged, were under-represented in the NISP telephone study (21). Nevertheless, the data revealed that the prone position was preferred by mothers of all racial and ethnic backgrounds; in 1992, 70.2 percent of the mothers polled reported usually placing their infant to sleep on the stomach (22).

The NISP telephone survey has been conducted annually since 1992. The surveys have chronicled the substantial changes in patterns of sleep position use occurring in the fourteen years since the study started. Use of the recommended supine sleep position



steadily rose from 13 percent in 1992<sup>\*</sup> to a peak of 72.8 percent in 2003 (22). The most recent survey completed in 2004 showed that 70.4 percent of all mothers usually place their infants in the supine position for sleep (22). As acceptance of the back sleeping position has increased, the proportion of infant deaths attributable to SIDS has decreased by 44 percent (7, 23). The most significant decrease in SIDS rates occurred from 1992 to 1999; there is a consensus among researchers that later declines are largely due to changes in the classification of infant deaths<sup>†</sup>(4, 23). Interestingly, as SIDS rates have fallen, the traditional seasonal association has diminished (5).

The decrease in SIDS deaths has been observed in all ethnic groups, but the change in SIDS rates is unevenly distributed (19). The lowest SIDS rates are seen in Asian and Hispanic infants; American-Indian and African-American<sup>‡</sup> infants have the highest rates (24). African-American infants have a markedly increased risk of SIDS relative to Caucasian infants, with an incidence more than two times that of Caucasians (5, 19, 20, 25). This increased relative risk has persisted despite the overall decline in SIDS deaths in both populations – the case rate in African-American infants was 2.38 per 1,000 live births in 1988 and 1.23/1000 in 2001 versus 1.22/1000 and 0.44/1000 for Caucasian infants in the same years (22).

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<sup>\*</sup> In 1992, 70.2 percent, 15.2 percent and 13.0 percent of mothers usually used the prone, lateral and supine positions with their infants, respectively. 1.6 percent of mothers chose a position other than the prone, lateral or supine position or said that their infant did not have a usual sleep position (22).

<sup>†</sup> Malloy and MacDorman conducted an analysis of causes of infant death from 1992 to 2001 (23). They noted that from 1999 to 2001, the number of infant deaths stayed stable, while the percentage of deaths attributed to SIDS steadily declined. They surmise that the decrease in SIDS rates during this latter period was due to changes in the classification of some infant deaths. The most recent policy statement from the American Academy of Pediatrics supports this assertion (4).

<sup>‡</sup> “African-American” is used to describe groups that self-identified as either Black or African-American. This group may include persons of African or Caribbean ancestry, regardless of place of birth. It may also include mixed race people who identify primarily as African-American or people who fall into the categories “African-American” and “Hispanic”. In contradistinction to the practices of the United States Census Bureau, the studies cited here generally exclude those who identify as “Hispanic” or “Latino” from the “African-American” group.

Studies designed to examine the racial disparities in SIDS rates have revealed that African-American caregivers are consistently more likely to use the prone sleeping position that confers increased risk of death from SIDS (3, 8, 19, 20, 26). Pollack et al. found that about 38%, 31% and 29% of African-American PRAMS\* participants reported using the prone position in 1996, 1997 and 1998, respectively (20). The prevalence of prone sleep in this group was higher for all time points studied, and the adjusted odds ratio (AOR) for prone sleep given African-American race was 1.45 compared to a reference of 1.00 for non-Hispanic Caucasian infants and an AOR of 0.81 for Hispanic infants (20). The multicenter Infant Care Practices Study conducted from 1995-1998 found AORs of 1.8-2.0 (depending on year of study) for prone sleep at 1 month given African-American race, compared to a reference of 1.0 for Caucasian infants (16). At infant age 3 months, the AORs were 1.6-1.9 (16).

Why are African-American caregivers more likely to use the stomach position with their infants? Case-control studies and population-based observational studies examining the prevalence of SIDS risk factors have collected data about characteristics that affect sleep position choices. One explanation for the increased relative use of the prone position by African-American mothers is that these women are more likely to report being advised to use the prone position by a doctor or nurse (3, 19). Infant mothers of all races tend to follow the advice given by health professionals; recommendations for supine, side and prone positioning increase the likelihood that the mother receiving that

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\* The Pregnancy Risk Assessment Monitoring System (PRAMS) is a surveillance system that collects information about maternal behaviors and experiences in various states (20, 26, 27). A random sample of mothers who have given birth in the previous 2 to 6 months are identified from birth certificates and are asked questions about infant health status and behavioral risks. Mothers from high-risk groups (ethnic minorities, mothers of premature infants) are usually oversampled. At least thirty-six states participate in the program, but the number of states with complete data varies from year to year (27).

advice will use those positions (19, 28). Some African-American mothers do not receive correct sleep position recommendations until after the death of an infant (29). Additionally, African-American infants may be more likely to live in larger families, which confers an increased risk of being put to sleep in the prone position (20).

In 2003, a sub-study of the NISP study was launched specifically to examine factors that influence infant caregivers' choices about sleep position, especially in high-risk populations (18). Nine focus groups composed of primarily African-American women (the group of interest) were formed to gather qualitative information about sources of advice influencing infant sleep position and reasons for use of particular sleep positions. Analysis of the participants' comments enabled identification of four themes that governed participants' choices about infant sleep position. The first important theme was safety; the major safety concern expressed in the focus groups was that the infant would choke: "It just seems obvious that they can choke like that." A second theme was infant comfort. Some participants thought that the infants looked more comfortable on the side or stomach, while others noted increased waking and startling with the supine position\*. A third factor in sleep position choices was advice received about how to put infants to sleep. Friends and family members were identified as important sources of advice. Health care professionals, on the other hand, were not uniformly trusted, and some participants were concerned with what seemed to be "constantly changing" recommendations about sleep position. The fourth factor or barrier to following Back to Sleep recommendations was lack of knowledge about SIDS and SIDS risk factors (18).

The information garnered from these focus groups led to the creation of a

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\* Researchers have found that infants placed in the supine position for sleep are more likely to experience sleep interruptions than are infants placed in the prone position (18).

standardized interview instrument that would be the cornerstone of that part of the NISP study concerned with the reasons underlying infant care practices. This new interview form facilitated gathering quantitative information about barriers to adherence to Back to Sleep recommendations, targeting caregivers of infants at high risk of SIDS. In the summer of 2004, this interview form was used to conduct 810 face-to-face interviews about sleep position, advice received about sleep position, and perceived barriers to compliance with provider recommendations about supine sleep position (unpublished data; manuscript submitted for publication).

Of the 810 interviews, 617 were conducted with mothers of infants. Fifteen percent of the mothers reported usually placing their infant in the prone position for sleep, and thirty-four percent used the prone position with their infant at some time. The mothers identified friends, family, doctors, and nurses as important sources of advice about sleep position. Most of the mothers interviewed trusted the advice they received from doctors, whereas a smaller percentage trusted the recommendations of friends and family members. Those women who received advice to put their infants in the supine position were more likely to use the supine position (unpublished data).

The 2004 interview form was revised to allow exploration of the trends observed; most notably, detailed questions were added about the participants' trust of recommendations received about sleep position. During the summer of 2005, this new interview form was used to further query participants about infant sleep positions used and sources of advice about sleep position.

Throughout the course of the 2005 interview season, it was noted anecdotally that

mothers with more than one child\* commonly related that they did not receive advice about infant sleep position with the present infant. These same participants also displayed a high level of trust in their own opinions about sleep position. This observation prompted an analysis of the frequency with which experienced caregivers receive recommendations about infant sleep position and the extent to which they trust the advice they do receive.

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\* Willinger et al. found that parity was a predictor of prone sleep; infants of multiparous women had an increased risk of being placed in the prone position (adjusted odds ratio 1.62 when compared to infants of primiparas, 95% CI 1.39-1.89) (28). Previous child-rearing experience is also a predictor of prone sleep (18, 30).

## **STATEMENT OF PURPOSE**

This endeavor aimed to uncover an association between prior child-rearing experience and the likelihood that mothers will follow Back to Sleep recommendations about infant sleep position. The hypothesis guiding investigation was that mothers with parenting experience beginning before the Back to Sleep campaign are less likely than mothers with younger children to follow recommendations about infant sleep position. The primary goal of the inquiry was to quantify the frequency with which these two groups of mothers use non-supine sleeping positions. Secondary aims included the identification of factors thought to influence choice of sleeping position, including receipt of advice about sleep position, sources of advice and the mothers' level of trust in advice received.

The ultimate goal was to identify a group of women whose infants may be at higher risk for Sudden Infant Death Syndrome (SIDS). Once identified, targeted interventions may be designed so that health care providers and health educators can facilitate the adoption of practices known to decrease the incidence of SIDS.

## **METHODS**

Eight hundred seventeen face-to-face interviews about infant care practices were conducted by trained interviewers at four Women, Infants and Children Centers in New Haven, CT, Atlanta, GA, Savannah, GA and Dallas, TX<sup>\*</sup>. The author was one of two interviewers at the New Haven, CT site. The participant group represents a convenience sample of all adults visiting these WIC centers from June to September 2005. The interview sites were chosen based on local availability of research staff and availability of semi-private interviewing space at each WIC center. Participant inclusion criteria were: 1) identification as the primary caregiver of an infant, 2) infant age less than eight months and 3) English fluency<sup>†</sup>. Participants who had already completed the interview in the current interview cycle were excluded. Research activities were approved by the institutional review boards of the Boston University School of Medicine, Yale University School of Medicine and the Texas Department of Health.

### ***Recruitment***

All persons presenting for services or accompanying a client were approached by research staff and asked to participate in interviews about infant care practices. Informed consent was obtained from all participants. Verbal consent was obtained in New Haven, Atlanta and Savannah; written consent was required in Dallas. Research staff kept daily logs of screening activities. For those people approached who did not participate, the

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<sup>\*</sup> The Special Supplemental Nutrition Program for Women, Infants and Children, alternately known as the WIC Program, is a federally funded program “providing nutritious foods to supplement diets, information on healthy eating, and referrals to health care.” Those eligible for WIC include pregnant, postpartum and breastfeeding women, and infants and children up to the age of 5 years (31).

<sup>†</sup> The researchers recognize that the service population of the WIC centers includes a significant number of non-English speakers. The groups of interest, however, are caregivers of infants at increased risk of dying from SIDS, namely African-American and American Indian infants. This focus and the logistical challenges associated with instrument translation (verbal and written) are thought to justify the exclusion of participants who cannot speak English fluently. The interview questions were read aloud to all participants; as such, English literacy was not assessed or required.

reason for ineligibility (language, infant age, not being primary caregiver, or refusal) was documented.

### ***Interview***

A standardized interview form (see Appendix A) was used to ask participants multiple choice questions about the following topics: their relationship to the infant in question, the infant's sleep positions and sleep environment, the nature of advice about sleep position that the participant received, the participant's degree of trust in advice received, and experience with other children. Pictures of common infant sleep environments were provided as a stimulus to conversation (e.g. "I am going to show you pictures of places where babies sometimes sleep. Can you show me where your baby usually sleeps?"). Interviewers also prompted participants to use a doll and blanket to demonstrate the position(s) in which they put their infant to sleep.

Several questions prompted the participants to rate the degree to which they trusted the advice they received about sleep position or the likelihood that someone would be able to change their mind about the sleep position they prefer. For these questions, respondents were shown a Likert scale (32), on which "1", "3" and "5" corresponded to "not at all", "somewhat" and "strongly", respectively. Interviewers assessed participant understanding of the scale and offered explanations as necessary.

Demographic questions were also asked as part of the interview; participants were queried about the infant's age and sex and their own age, sex, ethnicity and level of education. Respondents' narrative comments were also recorded as needed for clarification of responses. At the conclusion of each interview, current guidelines about prevention of Sudden Infant Death Syndrome were reviewed and the participants were



encouraged to ask questions about the topics discussed during the interview. Each participant was given a \$10 gift card to a local store. The duration of interviews varied from 10 to 20 minutes.

### ***Data Analysis***

Completed screening logs and interview forms were sent to the study's Data Coordinating Center at the Boston University School of Public Health via facsimile. Responses were scanned into a computerized database using RightFax software (RightFax 8.5, Captaris, Bellevue, WA). The same software was used to check data entries. Uncertain entries were manually confirmed. All continuous and ordinal variables were dichotomized to enable bivariate analysis. Bivariate analysis was conducted by Denis Rybin of the Boston University School of Public Health using SAS software (SAS 9.1, SAS Institute, Cary, NC).

## RESULTS

### *Screening*

A total of 1952 adults were approached for participation at the four WIC centers. Of these, 1135 were ineligible to participate (see Table 1 for exclusion reasons). Demographic information about those refusing participation was not collected. 817 individuals aged 14 to 45 completed the interview session. 722 of these interviews were conducted with mothers of infants. Only 668 mothers answered the all the questions of interest, and this group was used for comparative analysis. The number of interviews was evenly distributed between the four sites (See Table 2).

**Table 1.** Screening results and reasons for ineligibility.

Total number of individuals screened:	1952
<i>Non-English speakers:</i>	255
<i>No infant younger than 8 months:</i>	726
<i>Not primary caregiver:</i>	32
<i>Refused study:</i>	122
Number of interviews after screening:	817

**Table 2.** Interview distribution by WIC center site.

	New Haven, CT	Atlanta, GA	Savannah, GA	Dallas, TX	Total
All participants	210 (26%)	208 (26%)	199 (24%)	200 (24%)	817
Mothers	172 (26%)	150 (23%)	164 (24%)	180 (27%)	668

### *Aggregate data for infant mothers*

The demographic makeup of the mothers interviewed is as follows: the mean participant age was 24.4 years (median 23 years, SD 5.6, range 14-45 years). Most of the participants had a high school diploma or equivalent (79%, see Table 3). The mean number of children for each participant was 2 (median 2 children, SD 1.1, range 1-7 children).

Regarding risk factors for SIDS, the supine position was the most common usual sleep position (see section entitled “Sleep position use among infant mothers”). The prevalence of other risk factors was distributed as follows:

Sleep environment: The most common sleep area was a crib or bassinet (495/721 or 69% of responses). An adult bed was the infant’s usual sleep area in 25% of interviews (181/721). When infants slept outside their usual sleep area, the adult bed was the most common alternate sleep location (239/555 or 43% of infants without an adult bed as the usual sleep area). In 86/624 (14%) of interviews, stuffed toys were sometimes or usually in the infant’s sleep area. 36% of infants (228/636) sometimes or usually had pillows in their sleep area.

Bed sharing: 443/722 (57%) of the mothers said that they sometimes or usually share a bed with their infant. Very few infants ever (i.e. sometimes or usually) shared a bed with another child (6%, 38/689) or with an adult who was not a parent (5%, 33/686).

Infant health problems: 110/721 (15%) of respondents said that their infants had been premature. 60 of 719 mothers (8%) said that their infants were not “generally healthy”; these infants’ health concerns were identified as prematurity (n=18), asthma (n=10), acid reflux or gastroesophageal reflux disease (n=7), “heart problems” (n=6) or other conditions, including infantile spasms, colic and unspecified illnesses.

### ***Comparison of infant mothers***

Among the 668 mothers with complete data, the ages of their children ranged from infancy to 21 years of age. The mean age of each participant’s infant was 4 months (SD 2.5 months). Questioning mothers with at least two children (n=368) revealed that

the mean age difference between children was 4 years (SD 2.9 years). 23 mothers had children with an age difference of at least ten years between them.

87 of the mothers interviewed (13%) had children 10 years old or older (Group A). The remainder (581 women, or 87%) had children aged under 10 (Group B). Of these, a subgroup of 282 women had at least one other child in addition to the infant about whom the interview questions were asked (Group B<sub>mult</sub>; 49% of Group B, or 42% of the total).

There was no statistically significant difference between Groups A and B with regard to educational background or ethnicity (see Tables 3 and 4)\*.

**Table 3.** Level of education of infant mothers from WIC center sample.

	Less than High School	High School or GED	Some College	College or more	Total
Group A	13/87 (15%)	36/87 (41%)	28/87 (32%)	10/87 (12%)	87 (100%)
Group B	127/581 (22%)	230/581 (40%)	163/581 (28%)	61/581 (10%)	581 (100%)
<b>Total</b>	<b>140/668 (21%)</b>	<b>266/668 (40%)</b>	<b>191/668 (29%)</b>	<b>71/668 (10%)</b>	<b>668 (100%)</b>

Differences between Groups A and B in each column are non-significant by chi-square analysis.

**Table 4.** Ethnic distribution of infant mothers from WIC center sample.

	Hispanic	Caucasian	African-American	Other	Total
Group A	12/87 (14%)	7/87 (8%)	64/87 (74%)	4/87 (4%)	87 (100%)
Group B	83/581 (14%)	95/581 (16%)	374/581 (65%)	29/581 (5%)	581 (100%)
<b>Total</b>	<b>95/668 (14%)</b>	<b>102/668 (15%)</b>	<b>438/668 (66%)</b>	<b>33/668 (5%)</b>	<b>668 (100%)</b>

Differences between Groups A and B in each column are non-significant by chi-square analysis.

### *Sleep position use among infant mothers*

Both groups of mothers were similar with regard to the sleeping position used for their current infants. Fewer than half the mothers said that they used the supine sleep position exclusively (237/668, or 36%). However, most mothers identified the supine position as the usual sleep position for their infants. 60/87 (69%) of Group A and 354/581 (61%) of Group B usually placed their children on the back for sleep ( $p=0.15$ ). When

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\* Race and ethnicity were not considered separately. Participants were asked if they identified as Hispanic; if the response was no, the participant was asked to choose a race from the following list: Black/African-American, Caucasian, multiracial or other. Narrative responses were recorded as necessary.

asked if they ever placed their infants in the prone position for sleep, 19/87 (22%) of Group A and 163/581 (28%) of Group B reported that they sometimes placed their infants in the prone position for sleep ( $p=0.22$ ).

155 women reported placing a previous child in the prone position for sleep (23% of all mothers, 42% of mothers with 2 or more children). More mothers in Group A used the prone position with a previous child (55/87 or 63%) than did the mothers in Group B<sub>multip</sub> (Group B minus first-time mothers; 100/282 or 36%) ( $p<0.0001$ ). Mothers who used the prone position with a previous child were less likely than first time mothers to use the supine position exclusively with their current infants (OR 0.58, 95% CI 0.38-0.89).

Hispanic and Caucasian mothers were more likely than African-American mothers to use only the back sleeping position with their infants (OR 2.13, 95% CI 1.35-3.34 for Hispanic mothers; OR 2.51, 95% CI 1.61-3.89 for Caucasian mothers).

The mothers gave multiple reasons for choosing the infant's usual sleep position (see Table 5). Mothers were also asked why they chose alternate sleep positions, when they did. The reasons given mirrored those underlying the choice of usual sleep position (see Table 6). Data was not analyzed for associations between reasons given and the usual sleep position.

**Table 5.** Reasons underlying choice of usual sleep position.

<u>Survey response</u>	<u>Number of Responses</u>
“It’s safer”	264
“Someone told me to”	123
“More comfortable”	113
“Prevent choking”	82
“Sleeps better/longer”	80
“Breathe easier”	18
“I used my own judgment”	15
<i>Other</i>	9
“Rolling”	4
“Feeding”	3
“I sleep in this position”	3
“Other child slept that way”	2
<b>Total</b>	<b>713</b>

**Table 6.** Reasons underlying choice of alternate sleep position.

<u>Survey response</u>	<u>Number of Responses</u>
“It’s safer”	102
“More comfortable”	98
“Someone told me to”	56
“Prevent choking”	52
“Sleeps better/longer”	48
“I used my own judgment”	20
“Breathe easier”	18
<i>Other</i>	16
“Rolling”	11
“I sleep in this position”	3
“Feeding”	2
“Other child slept that way”	1
<b>Total</b>	<b>427</b>

***Receipt of advice about infant sleep position***

Participants were asked whether they had received advice about infant sleep position for the current infant from family, friends, media (defined as television, radio, newspapers or magazines), doctors or nurses. Group A was significantly less likely than Group B to have received sleep position advice from family members ( $p < 0.0001$ , see Table 7). The proportion of mothers who received advice from each of the remaining four sources was similar in each group. Sorted from most common to least common by

percentage of mothers reporting having received advice from each source, these are: doctors (81%), nurses (63%), media (46%) and friends (15%).

**Table 7.** Sources of advice about infant sleep position.

	Doctors*	Nurses	Media	Family	Friends
Group A	72/87 (83%)	53/87 (61%)	36/87 (41%)	12/87 (14%)	12/87 (14%)
Group B	471/581 (81%)	365/581 (63%)	273/581 (47%)	249/581 (43%)	88/581 (15%)
<b>Total</b>	<b>543/668 (81%)</b>	<b>418/668 (63%)</b>	<b>309/668 (46%)</b>	<b>261/668 (39%)</b>	<b>100/668 (15%)</b>

\*P value for difference in advice given by family is <0.0001 by chi-square analysis. All other differences are non-significant. Numbers and percentages reflect those participants indicating that they received advice about sleep position from the source in each column. Total number of responses exceeds the number of participants because participants were allowed to identify more than one advice source.

### *Nature of advice about infant sleep position*

Those participants indicating that they had received advice from one or more of the sources mentioned above were asked which sleeping positions the advisor recommended. Possible answers were: 1) back, 2) back and side, 3) side, 4) stomach or 5) other. For the purposes of analysis, these options were dichotomized into “supine” and “non-supine” categories. Although the advocacy of supine sleep positioning was different for each source of advice, there was no difference between the advice offered to the mothers in Groups A and B (see Table 8).

**Table 8.** Nature of advice about infant sleep position, by advice source.

	Family		Friends		Media		Doctors		Nurses	
	Supine	Non-supine	Supine	Non-supine	Supine	Non-supine	Supine	Non-supine	Supine	Non-supine
Group A	42% n=5	58% n=7	50% n=6	50% n=6	80% n=30	20% n=6	69% n=50	31% n=22	70% n=37	30% n=16
Group B	43% n=106	57% n=143	58% n=51	42% n=37	76% n=221	24% n=52	73% n=345	27% n=126	73% n=267	27% n=98
<b>Total</b>	<b>43% n=111</b>	<b>57% n=150</b>	<b>57% n=57</b>	<b>43% n=43</b>	<b>81% n=251</b>	<b>19% n=58</b>	<b>73% n=395</b>	<b>27% n=148</b>	<b>73% n=304</b>	<b>27% n=114</b>

Differences between Groups A and B in each category are non-significant by chi-square analysis.

For both groups of mothers, friends and family tended to recommend the supine and non-supine sleeping positions with about equal frequency. Media sources, doctors and nurses recommended the supine sleeping position in the majority of cases.

Those mothers who said that they had their own opinion about sleep position were asked what position they considered to be superior. The two groups indicated almost equal preference for supine and non-supine positioning. 49% of Group A (n=65) and 51% of Group B (n=423) preferred the supine position (p=0.90).

### ***Trust in recommendations about sleep position***

Mothers who received advice about infant sleep position were shown a Likert scale (32) and asked to rate the degree to which they trusted the advice given. Acceptable responses ranged from 1 to 5, with “1” corresponding to the respondent not trusting the advice at all, and a “5” meaning that she trusted the advice a great deal. For the purposes of analysis, the responses were dichotomized, with 1-3 grouped into “no trust” and 4-5 into “trust”.

**Table 9.** Trust in advice about sleep position.

	Family		Friends		Media		Doctors		Nurses	
	Trust	No trust	Trust	No trust	Trust	No trust	Trust	No trust	Trust	No trust
Group A	58% n=7	42% n=5	67% n=8	33% n=4	78% n=28	22% n=8	93% n=67	7% n=5	91% n=48	9% n=5
Group B	76% n=190	24% n=59	56% n=49	44% n=39	75% n=204	25% n=69	88% n=414	12% n=57	84% n=308	16% n=57
<b>Total</b>	<b>76%</b> <b>n=197</b>	<b>24%</b> <b>n=64</b>	<b>57%</b> <b>n=57</b>	<b>43%</b> <b>n=43</b>	<b>75%</b> <b>n=232</b>	<b>25%</b> <b>n=77</b>	<b>89%</b> <b>n=481</b>	<b>11%</b> <b>n=62</b>	<b>85%</b> <b>n=356</b>	<b>15%</b> <b>n=62</b>

Differences between Groups A and B in each category are non-significant by chi-square analysis.

For each advice source, there was no significant difference between the groups with regard to the extent to which they trusted the advice received. For all mothers, advice from doctors, nurses, family and the media was trusted more often than was the advice received from friends.

Most of the participants also demonstrated confidence in their own opinions about sleep position. 61/65 (93%) of Group A mothers and 410/423 (97%) of Group B mothers said that they trusted their own opinion about sleep position (p=0.21)..



## DISCUSSION

More than ten years have passed since physicians began routinely advocating the use of back sleeping to prevent Sudden Infant Death Syndrome. The basic message that the supine sleep position is the safest position has remained stable despite revisions based on emerging data (see Figure 1). The American Academy of Pediatrics' Task Force on Sudden Infant Death Syndrome issued an updated policy statement in November 2005 (4). This document introduces one important change in AAP policy: "the AAP no longer recognizes side sleeping as a reasonable alternative to fully supine sleeping."

**Figure 1.** Timeline of American Academy of Pediatrics (AAP) Policy Recommendations on Infant Sleep Position.

1992: (15)	Non-prone position recommended for all healthy infants; neither supine nor side position is preferred.  Infants with certain health conditions should be placed in the prone position: premature infants with symptomatic respiratory disease, symptomatic gastroesophageal reflux disease (GERD) or craniofacial abnormalities.
1994: (2)	<i>Back to Sleep campaign begins</i> (4, 5, 12, 18, 19)  AAP reaffirms 1992 policy statement, with the recognition that the side sleeping position may be less safe than the supine position, and that premature infants may benefit from supine sleep position.
1996: (33)	Non-prone position recommended for all healthy infants; supine position is preferred, side position is acceptable.  Infants with certain health conditions should be positioned based on pediatrician's recommendations: symptomatic GERD, certain airway malformations.
2000: (5)	AAP reaffirms sleep position advice in 1996 policy statement.  "Individual medical conditions may warrant a physician to recommend otherwise, after weighing the relative risks and benefits." (No specific conditions are mentioned.)
2005: (4)	Supine position recommended for all healthy infants, side position not an acceptable alternative.

The importance of using the supine sleep position as a SIDS risk reduction strategy led to the development of the highly successful Back to Sleep (BTS) campaign, which has been the driving force behind drastic shifts in sleep position practices in the United States (4, 5). Acceptance of the back sleeping position increased steadily in the late 1990s; the supine sleep position now predominates and sleep position preferences have been stable for the last several years (20, 22). The BTS campaign remains active and is sponsored by the National Institute of Child Health and Human Development, the Maternal and Child Health Bureau, the American Academy of Pediatrics, the SIDS Alliance and the Association of SIDS and Infant Mortality Programs (34). Promotional materials featuring African-American families have been designed to reach African-American caregivers in particular. In addition to the aforementioned agencies, the National Association for the Advancement of Colored People (NAACP) and the National Medical Association (a national association of African-American physicians) are among the partners in this outreach effort (35).

Despite the widespread adoption of the back position, a number of studies find that a sizable proportion of infant caregivers sometimes or usually place infants in the prone or side position for sleep (16, 22, 28, 36); our data replicate this finding. Obstacles to acceptance of the supine sleep position include both real and perceived complications with non-prone sleeping, including plagiocephaly, developmental delay, concerns about aspiration and increased likelihood of illness. Positional plagiocephaly is flattening of the skull that is associated with the supine sleep position (5, 33). To prevent plagiocephaly, pediatricians advocate varying the infant's head position for sleep and allowing the infant to have daily "tummy time" – time on the stomach during which the infant is awake (5,

35). Regarding developmental progress, a study in the United Kingdom found that infants placed to sleep in the recommended supine position lagged behind infants who slept prone in three of ten developmental scales administered at six months of age. At eighteen months, the differences were no longer apparent, and the authors stated that the apparent transient developmental delay did not outweigh the benefit of supine sleeping (37). Concerns about aspiration and increased likeliness of illness appear to be unfounded. Infants placed to sleep in the prone position have been found to be *more* likely to aspirate (5) and the incidence of common childhood illnesses was not related to sleep position in a study by Hunt et al (38).

Another problem with acceptance of the supine position is lack of belief in the association between SIDS and sleep position. Moon et al. found that only 28.1% of adult caregivers surveyed at a WIC clinic believed that prone sleeping definitely increases the risk of SIDS (19). The 2004 NISP interviews also found that a minority of caregivers surveyed at four WIC centers (Los Angeles, CA, Dallas, TX, New Haven, CT and Boston, MA) believed that infant sleeping position is related to SIDS (unpublished data).

African-American caregivers are more likely than caregivers of other ethnicities to place infants to sleep in the prone position (3, 19, 20, 22). This predisposition for using the prone position provides a partial explanation for the increased risk of SIDS observed in African-American infants (3, 4). The National Infant Sleep Position telephone study also found that African-American caregivers were more likely to share a bed with an infant than were Caucasian or Hispanic caregivers (21). Barriers to acceptance of Back to Sleep recommendations in groups that are mostly African-American have been studied and include: concerns about infant safety and comfort, advice received about sleep

position and knowledge about SIDS (18), including disbelief in the association between sleep position and SIDS (19). In our sample, infant safety, comfort, and “someone told me to” were given as the most common reasons underlying usual sleep position. The same reasons were given as important in the choice of an alternate sleep position. The present study sought to further inform the discussion about factors motivating choices about sleep position by identifying an at risk population, specifically, mothers with children born at or before initiation of the BTS campaign.

Women with older children (Group A) were found to differ from women with younger children in two important ways. The women with older children were more likely to have placed a previous child in the prone position for sleep, which is known to be associated with current use of the prone position (29, 30). Secondly, the mothers with older children were less likely to receive sleep position recommendations from family members.

The two groups of mothers compared were similar in most other respects, but the aggregate data reveal interesting findings about this high-risk sample. Most mothers report usually using the supine sleep position with their infants, even though just half the mothers in our sample believe that the supine position is the best sleep position. This contradiction between usual sleep position and belief may explain the finding that 27% of mothers have used the prone position at some point with their infant. This latter figure is particularly concerning given evidence that prone sleep in infants accustomed to non-prone sleep positions may confer increased risk of SIDS compared to usual prone sleep (12).

The mothers in our sample received advice from family, friends, doctors, nurses and the media. The majority of women received advice from doctors and nurses. Fewer than half identified the media and family as advice sources, and most women did not receive sleep position advice from friends. It is encouraging that health professionals are an important source of advice about sleep position. This advice was, for the most part, consistent with AAP recommendations advocating the supine position, and the participants indicated that they trusted the advice given to them by doctors and nurses. Participants were also asked how likely it was that doctors and nurses would be able to change their minds about infant sleep position; 68% and 60% of mothers said that doctors and nurses would be able to change their opinions, respectively (data not shown). Other studies have found that health care providers are influential in mothers' sleep position choices (3, 28). Parents who report being advised to place their infants in the supine position for sleep are more likely to do so (39), and parents that see their children being placed on the back to sleep in the hospital nursery are more likely to adopt the supine position at home (40).

There are several limitations to the research described herein. First, the study participants represent a convenience sample of all infant mothers. This sampling strategy may result in under-representation of mothers who do not use WIC services and mothers in rural areas or geographic areas not represented by the four sites in this study, such as the Pacific Northwest or the Midwest. Within each WIC center, adults who presented for services while the research staff were interviewing were not screened. While it is not possible to know the demographic characteristics of the people who were not screened, it is reasonable to presume that these individuals are similar to the people approached for

participation. Even though convenience samples are not the ideal study population, they enable the examination of phenomena that would otherwise be difficult to explore given the constraints of time and limited resources.

Second, the study participants were a self-selecting group. Demographic data about the people who refused participation was not collected; it is therefore not possible to assess the similarity of the group that refused to those that completed the interview. When conducting research in a majority African-American population, distrust of researchers is a concern that may affect the ability to generalize results. There is a well-documented history of reluctance on the part of African-American subjects to participate in research that relates to a general mistrust of medical care systems (41). It is possible that those subjects refusing participation are distrustful of health care providers in general and therefore may be less likely to follow recommendations about infant sleep position. In future studies, asking potential participants about the reasons for refusal may help determine whether this group is indeed different from the people completing interviews.

Third, for ease of analysis, the comparison groups were divided arbitrarily into two groups of mothers who had children of different ages. The groups were divided on the basis of the age of the oldest child to determine whether women whose child-rearing experience had begun prior to the Back to Sleep recommendations would position their new infants differently than mothers with younger children. This division was deemed to be reasonable given evidence that children born after the BTS campaign are much more likely to be placed to sleep in the supine position (19, 22) and that infants are more likely to be placed supine when previous children were placed supine (19). Alternately, the groups could have been divided on the basis of parity (26, 28), the age difference

between children, by using a different cutoff point for the ages of participants' children or by analyzing the data using age of previous children as a continuous variable. Another approach might have been the exclusion of first-time mothers from the comparison sample. It is possible that the sleep position practices of first-time mothers differ from those of multiparous women, and the comparison of multiparous women with children younger or older than age 10 might have yielded statistically significant differences. Although mean age is not available for the groups of mothers compared, exclusion of primiparous women, who are presumably younger, would also bring the comparison groups closer together demographically.

Fourth, data were based on the responses volunteered by participants, which subjects the data to recall bias and to manipulation by participants offering what they perceive to be the desired response to a given question. Other investigators have addressed the concern that sleep position information is subject to faulty recall, but case-control studies where respondent information is corroborated with death scene investigation reports indicate that recall bias is a relatively minor phenomenon in this population (3, 12). Asking questions about infant sleep "last night" in addition to usual practices helps diminish recall bias; agreement between the "last night" responses and the "usual" responses was uniformly present (data not shown). Another concern is that participants may know that the back sleeping position is the only "acceptable" sleeping position, and they may be unwilling to admit use of a non-recommended sleep position (20). The interviewing staff did not identify themselves as medical personnel and attempted to establish rapport with each participant by using the infant's first name when possible, which may have encouraged respondents to give truthful answers.

Fifth, data was collected from geographically distant sites but analyzed in aggregate. Maternal responses about sleep position in the Pregnancy Risk Assessment Monitoring System database reveal state-to-state differences in the prevalence of the different sleep positions (20, 26). Geographic differences in infant care practices might have confounded the comparison of the two groups of mothers. Increasing the number of participants at each site would increase statistical power of the study, allowing for inter-site comparison of demographic characteristics and SIDS risk factors.

Lastly, the interview instrument was not designed to specifically study the association between child-rearing experience and sleep position. Rather, questions were asked to collect prevalence data about sleep position practices, and known and suspected SIDS risk factors. Comparison of infant mothers might have been improved by asking additional questions about experience with other children, age at time of motherhood, and the time at which each mother became aware of the Back to Sleep recommendations. The cross-sectional design of the study also prevents the assessment of how infant sleep position may change as the participants' infant changes. There is evidence that some mothers use the supine sleep position with their newborns and switch to the prone position, sometimes when the infant is in the peak age range for SIDS (5). One participant said that she switched from the supine to prone sleep position when her infant reached three months of age. Increasing the number of questions and interviewing each participant at different time points may yield more information about risky behaviors. In general, however, decreasing the burden of the respondent's involvement is an important consideration (21) that helps increase the participation rate of target populations.



Despite the limitations outlined above, the interviews conducted with infant mothers revealed important data about choices influencing infant sleep position in a high-risk population. Specifically, prone sleeping persists in this high-risk population, bed-sharing is a common occurrence, and health care providers are important, trusted sources of advice about infant sleep position. Mothers of older children were not found to use the prone position more than mothers of younger children, but they were more likely to have used the prone position with their other children. This practice has been found in other studies to be associated with increased use of the prone position with current infants (20). Indeed, when the multiparous women in this sample are compared en bloc to the first-time mothers, there is an inverse relationship between prone positioning with a previous infant and exclusive use of the supine position with the current infant. If this association is true, mothers of older children may represent a subgroup in our high-risk population with an even higher risk for use of prone positioning, whose infants may be at elevated risk of SIDS.

### ***Conclusions***

“The Department of Health and Human Services has outlined as a priority for its agencies the reduction of health disparities in the United States, particularly among racial, ethnic, and linguistic subpopulations. This bold step was taken because of the increasing identification of disparities in health status, health outcomes, access to care, and health care treatments (42).”

Sudden Infant Death Syndrome, as the leading cause of post-neonatal infant mortality in the United States (4), is a major obstacle to improving health outcomes of children in this county. A distressing aspect of the SIDS problem is the ethnic disparity in SIDS rates, with African-American and American-Indian infants comprising a disproportionate number of SIDS cases (4, 22). Work with groups in which African-American caregivers are overrepresented have identified prone positioning (3, 4, 16, 19)

and bed sharing (8, 21) as modifiable risk factors that are common in this population. Targeted outreach materials such as brochures, posters, newsletters, and refrigerator magnets have tried to promote the supine sleep position in this high-risk group (35), but such traditional health promotion methods may be less effective in African-American communities (19). Rather, small group interventions (19) or individual discussions with health care providers may be more important in affecting the sleep position practices of African-Americans. Universal use of the supine sleep position in an inner city nursery combined with education by nursing staff was found to significantly increase the percentage of parents that reported putting their infants to sleep on the back (40). The data presented here support the idea that, within a high-risk population, subsets of caregivers whose infants are at even higher risk of succumbing to SIDS can be identified for the purposes of focusing efforts to decrease the prevalence of SIDS risk factors and ultimately of SIDS itself.

## APPENDIX A: Interview instrument



33212

DATE:

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Interviewer ID

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### NICHHD - Survey of Households with Children 0-7 Months Old

Thank you for your willingness to participate in this project. I will be asking you questions about how you take care of the baby. When answering the questions, please think about the youngest baby you care for. Can you tell me the name of that baby?

INTERVIEWER: Fill in baby first name _____	Age <input type="radio"/> <sub>1</sub> <1 month <input type="radio"/> <sub>5</sub> 4<5 mo
	<input type="radio"/> <sub>2</sub> 1<2 mo <input type="radio"/> <sub>6</sub> 5<6 mo
Respondent's first name _____	<input type="radio"/> <sub>3</sub> 2<3 mo <input type="radio"/> <sub>7</sub> 6<7 mo
	<input type="radio"/> <sub>4</sub> 3<4 mo <input type="radio"/> <sub>8</sub> 7<8 mo
Ask Exactly how old is your baby? _____	(If > 8 months not eligible)

#### A. Infant Care Practices

##### 1. Respondent's Gender

- ☐ <sub>1</sub> Male  
☐ <sub>2</sub> Female

##### 2. Baby's Gender

- ☐ <sub>1</sub> Male  
☐ <sub>2</sub> Female

##### 3. How are you related to (NAME)?

(do not read- choose one)

- |   |  |
|---|--|
| <input type="radio"/> <sub>1</sub> Mother       | <input type="radio"/> <sub>2</sub> Aunt    |
| <input type="radio"/> <sub>4</sub> Father       | <input type="radio"/> <sub>5</sub> Uncle   |
| <input type="radio"/> <sub>7</sub> Grandmother  | <input type="radio"/> <sub>9</sub> Sibling |
| <input type="radio"/> <sub>10</sub> Grandfather | <input type="radio"/> <sub>11</sub> Friend |

##### ☐ <sub>3</sub> Paid caretaker

##### ☐ <sub>6</sub> Foster parent

##### ☐ <sub>9</sub> Other (specify) \_\_\_\_\_

##### 4. What does (NAME) drink most of the time?

- ☐ <sub>1</sub> Formula  
☐ <sub>2</sub> Breastmilk  
☐ <sub>3</sub> Both  
☐ <sub>4</sub> Other \_\_\_\_\_

##### 5. Has a doctor ever talked with you about using pacifiers?

- ☐ <sub>1</sub> Yes  
☐ <sub>2</sub> No  
☐ <sub>3</sub> Don't know

##### a. If yes, How would you describe the doctor's attitude towards using pacifiers?

- ☐ <sub>1</sub> Positive  
☐ <sub>2</sub> Negative  
☐ <sub>3</sub> Neutral  
☐ <sub>4</sub> Not sure

Site:

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\* 1 2 \*

Page 1 of 12

Code:

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\* 1 2 3 \*



33212

## B. Sleeping Environment

Now I'm going to show you some pictures and we'll use some props. We're going to talk about how you place your baby, in what setting and what your baby is wearing.

### USUALLY

PLACE (only 1)

Please point to the one that shows where (NAME) usually slept over the last 2 weeks. These are not all of the places there might be, please tell us if there are other places.

POSITION (only 1)

Using the doll and any props you see, please show me the position you usually place (NAME) to sleep over the last 2 weeks.

REASON (only 1)

Please tell me the most important reason why you usually place (NAME) to sleep in this position.

### SOMETIMES

PLACES (can be up to 3)

Please point to the ones that show the places where (NAME) sometimes slept over the last 2 weeks.

POSITIONS (can be up to 3) (if these change, code in order of frequency 1=most often...)

Using the doll and any props you see, please show me the positions you sometimes place (NAME) to sleep over the last 2 weeks.

REASON (can be up to 3)

Please tell me the most important reason why you sometimes place (NAME) to sleep in this position. (sometimes 1, sometimes 2, sometimes 3)

### LAST NIGHT

PLACES (can be up to 3)

Please point to the picture that show the places where (NAME) slept last night. If the information is not volunteered, prompt caregiver for baby waking during the night and the place the baby is returned to. "Did (NAME) wake up during the night? Please point to the picture that shows where (NAME) went to sleep after waking up during the night."

POSITIONS (can be up to 3)

Using the doll and any props you see, please show me the positions you placed (NAME) to sleep last night. (If the information is not volunteered, prompt caregiver for baby waking during the night and the position the baby is returned to. "When (NAME) woke up during the night, show me the position you returned (NAME) to after waking up during the night.") Also show me what the sleep environment is like using the props. If you normally have something that is not here let us know.

REASON (can be up to 3) Please tell me the most important reason why you usually place (NAME) to sleep in this position. (last night 1, last night 2, last night 3)

(Interviewer: Please use the grid on the next page to record sleeping environment)



1. PLACE	Usual (choose 1)	Sometimes (up to 3)	Last Night (up to 3)
a. Crib	<input type="radio"/>	<input type="radio"/> -1 <input type="radio"/> -2 <input type="radio"/> -3	<input type="radio"/> -1 <input type="radio"/> -2 <input type="radio"/> -3
b. Bassinet	<input type="radio"/>	<input type="radio"/> -1 <input type="radio"/> -2 <input type="radio"/> -3	<input type="radio"/> -1 <input type="radio"/> -2 <input type="radio"/> -3
c. Mechanical Swing	<input type="radio"/>	<input type="radio"/> -1 <input type="radio"/> -2 <input type="radio"/> -3	<input type="radio"/> -1 <input type="radio"/> -2 <input type="radio"/> -3
d. Cradle	<input type="radio"/>	<input type="radio"/> -1 <input type="radio"/> -2 <input type="radio"/> -3	<input type="radio"/> -1 <input type="radio"/> -2 <input type="radio"/> -3
e. Carry cot/Travel Bed	<input type="radio"/>	<input type="radio"/> -1 <input type="radio"/> -2 <input type="radio"/> -3	<input type="radio"/> -1 <input type="radio"/> -2 <input type="radio"/> -3
f. Adult bed	<input type="radio"/>	<input type="radio"/> -1 <input type="radio"/> -2 <input type="radio"/> -3	<input type="radio"/> -1 <input type="radio"/> -2 <input type="radio"/> -3
g. Mattress	<input type="radio"/>	<input type="radio"/> -1 <input type="radio"/> -2 <input type="radio"/> -3	<input type="radio"/> -1 <input type="radio"/> -2 <input type="radio"/> -3
h. Sofa	<input type="radio"/>	<input type="radio"/> -1 <input type="radio"/> -2 <input type="radio"/> -3	<input type="radio"/> -1 <input type="radio"/> -2 <input type="radio"/> -3
i. Car Seat (not in car)	<input type="radio"/>	<input type="radio"/> -1 <input type="radio"/> -2 <input type="radio"/> -3	<input type="radio"/> -1 <input type="radio"/> -2 <input type="radio"/> -3
j. Infant seat	<input type="radio"/>	<input type="radio"/> -1 <input type="radio"/> -2 <input type="radio"/> -3	<input type="radio"/> -1 <input type="radio"/> -2 <input type="radio"/> -3
k. Cot	<input type="radio"/>	<input type="radio"/> -1 <input type="radio"/> -2 <input type="radio"/> -3	<input type="radio"/> -1 <input type="radio"/> -2 <input type="radio"/> -3
l. Drawer	<input type="radio"/>	<input type="radio"/> -1 <input type="radio"/> -2 <input type="radio"/> -3	<input type="radio"/> -1 <input type="radio"/> -2 <input type="radio"/> -3
m. On the floor	<input type="radio"/>	<input type="radio"/> -1 <input type="radio"/> -2 <input type="radio"/> -3	<input type="radio"/> -1 <input type="radio"/> -2 <input type="radio"/> -3
n. Stroller	<input type="radio"/>	<input type="radio"/> -1 <input type="radio"/> -2 <input type="radio"/> -3	<input type="radio"/> -1 <input type="radio"/> -2 <input type="radio"/> -3
o. Playpen	<input type="radio"/>	<input type="radio"/> -1 <input type="radio"/> -2 <input type="radio"/> -3	<input type="radio"/> -1 <input type="radio"/> -2 <input type="radio"/> -3
p. Other:	<input type="radio"/>	<input type="radio"/> -1 <input type="radio"/> -2 <input type="radio"/> -3	<input type="radio"/> -1 <input type="radio"/> -2 <input type="radio"/> -3

## 2. POSITION

a. Back	<input type="radio"/>	<input type="radio"/> -1 <input type="radio"/> -2 <input type="radio"/> -3	<input type="radio"/> -1 <input type="radio"/> -2 <input type="radio"/> -3
b. Side	<input type="radio"/>	<input type="radio"/> -1 <input type="radio"/> -2 <input type="radio"/> -3	<input type="radio"/> -1 <input type="radio"/> -2 <input type="radio"/> -3
c. Stomach	<input type="radio"/>	<input type="radio"/> -1 <input type="radio"/> -2 <input type="radio"/> -3	<input type="radio"/> -1 <input type="radio"/> -2 <input type="radio"/> -3
d. Other: _____	<input type="radio"/>	<input type="radio"/> -1 <input type="radio"/> -2 <input type="radio"/> -3	<input type="radio"/> -1 <input type="radio"/> -2 <input type="radio"/> -3

Interviewer prompt

[Do you ever place (NAME) on the stomach for sleep? If yes, fill out grid accordingly.]

## 3. REASON

a. More Comfortable	<input type="radio"/>	<input type="radio"/> -1 <input type="radio"/> -2 <input type="radio"/> -3	<input type="radio"/> -1 <input type="radio"/> -2 <input type="radio"/> -3
b. Prevent choking	<input type="radio"/>	<input type="radio"/> -1 <input type="radio"/> -2 <input type="radio"/> -3	<input type="radio"/> -1 <input type="radio"/> -2 <input type="radio"/> -3
c. Breath easier	<input type="radio"/>	<input type="radio"/> -1 <input type="radio"/> -2 <input type="radio"/> -3	<input type="radio"/> -1 <input type="radio"/> -2 <input type="radio"/> -3
d. Sleeps better/longer	<input type="radio"/>	<input type="radio"/> -1 <input type="radio"/> -2 <input type="radio"/> -3	<input type="radio"/> -1 <input type="radio"/> -2 <input type="radio"/> -3
e. I sleep in this position	<input type="radio"/>	<input type="radio"/> -1 <input type="radio"/> -2 <input type="radio"/> -3	<input type="radio"/> -1 <input type="radio"/> -2 <input type="radio"/> -3
f. Other child slept that way	<input type="radio"/>	<input type="radio"/> -1 <input type="radio"/> -2 <input type="radio"/> -3	<input type="radio"/> -1 <input type="radio"/> -2 <input type="radio"/> -3
g. Used my own judgement	<input type="radio"/>	<input type="radio"/> -1 <input type="radio"/> -2 <input type="radio"/> -3	<input type="radio"/> -1 <input type="radio"/> -2 <input type="radio"/> -3
h. It's safer	<input type="radio"/>	<input type="radio"/> -1 <input type="radio"/> -2 <input type="radio"/> -3	<input type="radio"/> -1 <input type="radio"/> -2 <input type="radio"/> -3
i. Rolling	<input type="radio"/>	<input type="radio"/> -1 <input type="radio"/> -2 <input type="radio"/> -3	<input type="radio"/> -1 <input type="radio"/> -2 <input type="radio"/> -3
j. Feeding <input type="radio"/> Breastfeed <input type="radio"/> Formula	<input type="radio"/>	<input type="radio"/> -1 <input type="radio"/> -2 <input type="radio"/> -3	<input type="radio"/> -1 <input type="radio"/> -2 <input type="radio"/> -3
k. Other: _____	<input type="radio"/>	<input type="radio"/> -1 <input type="radio"/> -2 <input type="radio"/> -3	<input type="radio"/> -1 <input type="radio"/> -2 <input type="radio"/> -3
l. Someone told me to	<input type="radio"/>	<input type="radio"/> -1 <input type="radio"/> -2 <input type="radio"/> -3	<input type="radio"/> -1 <input type="radio"/> -2 <input type="radio"/> -3

	Never	Sometimes	Usual	Last Night
<b>4. DOES (NAME) SLEEP IN A ROOM WITH ANOTHER PERSON?</b>				
a. With parent(s)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b. With other adult	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. With other child	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>5. DOES (NAME) SHARE A BED WITH ANOTHER PERSON?</b>				
a. With parent(s)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b. With other adult	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. With other child	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>6. REASON FOR BED SHARING</b>				
a. Comfort	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b. Convenience	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. Only possible place to sleep	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d. Afraid to wake baby	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e. Too tired	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
f. Don't know	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
g. Feeding <input type="radio"/> Breastfeeding <input type="radio"/> Formula	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
h. Other: _____	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>7. WHAT IS IN THE BED WITH (NAME)</b>				
a. Bumpers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b. Pillows	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. Quilts/thick blanket	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d. Light/receiving blanket	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e. Stuffed toys	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
f. Other: _____	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>8. IS (NAME) PUT DOWN TO SLEEP AT NIGHT WITH A PACIFIER?</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>9. DOES (NAME) USE A PACIFIER DURING DAYTIME NAPS?</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/> (Yesterday)
<b>10. DOES (NAME) USE A PACIFIER DURING THE DAY WHILE AWAKE?</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/> (Yesterday)



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11. When (NAME) was born, in what position did the staff in the hospital place (NAME) to sleep? (Check all that apply)

- ☐ Side
- ☐ Stomach
- ☐ Back
- ☐ Side and back
- ☐ Some other position \_\_\_\_\_ (Specify)
- ☐ Don't know

12. If you had a friend who just had a baby and she asked you what position she should place her baby to sleep, what would you tell her? (Check all that apply)

- ☐ Side
- ☐ Back
- ☐ Stomach
- ☐ Whatever made the baby comfortable
- ☐ Other \_\_\_\_\_
- ☐ Don't know

a. Why? (check all that participant mentions)

- ☐ Seems more comfortable
- ☐ Sleeps better
- ☐ It's safer
- ☐ So the baby won't choke
- ☐ Doctor/Nurse recommendation
- ☐ Other, specify: \_\_\_\_\_





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### C. Opinions About Sleep Position

So far most of the questions have been about sleep position. Now we are going to ask you some questions about YOUR thoughts about baby care. You can answer some of the questions with yes/no or don't know. Some of the questions will ask you to rank your feelings on a scale of 1 (least or worst) to 5 (most or best). (PLEASE SHOW LAMINATED CARD)

#### 1. DID YOU GET ADVICE FROM FAMILY ABOUT WHAT POSITION (NAME) SHOULD BE PLACED TO SLEEP?

- ☐ Yes  
☐ No (skip to Q#2)  
☐ Don't know (skip to Q#2)

a. Overall what sleep position did they recommend? (Choose 1) ☐ Back ☐ Side ☐ Stomach ☐ Back & Side  
☐ Other (specify) \_\_\_\_\_

	1 (least)	2	3	4	5 (most)	Don't know
b. How strongly did they recommend this sleep position to you?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. How much do you trust this person's advice?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d. How important was this advice to you in making your final decision about how to place (NAME) to sleep?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

e. Comments: (text box)

#### 2. DID YOU GET ADVICE FROM FRIENDS ABOUT WHAT POSITION (NAME) SHOULD BE PLACED TO SLEEP?

- ☐ Yes  
☐ No (skip to Q#3)  
☐ Don't know (skip to Q#3)

a. Overall what sleep position did they recommend? (Choose 1) ☐ Back ☐ Side ☐ Stomach ☐ Back & Side  
☐ Other (specify) \_\_\_\_\_

	1 (least)	2	3	4	5 (most)	Don't know
b. How strongly did they recommend this sleep position to you?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. How much do you trust this person's advice?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d. How important was this advice to you in making your final decision about how to place (NAME) to sleep?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

e. Comments: (text box)







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3. DID YOU GET ADVICE FROM THE MEDIA (TV, RADIO, MAGAZINES, NEWSPAPERS) ABOUT WHAT POSITION (NAME) SHOULD BE PLACED TO SLEEP?

- ☐ Yes  
☐ No (skip to Q#4)  
☐ Don't know (skip to Q#4)

a. Overall what sleep position did they recommend? (Choose 1) ☐ Back ☐ Side ☐ Stomach ☐ Back & Side  
☐ Other (specify) \_\_\_\_\_

	1 (least)	2	3	4	5 (most)	Don't know
b. How strongly did they recommend this sleep position to you?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. How much do you trust this advice?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d. How important was this advice to you in making your final decision about how to place (NAME) to sleep?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

e. Comments: (text box)

4. DID YOU GET ADVICE FROM DOCTORS ABOUT WHAT POSITION (NAME) SHOULD BE PLACED TO SLEEP?

- ☐ Yes  
☐ No (skip to Q#5)  
☐ Don't know (skip to Q#5)

a. Overall what sleep position did they recommend? (Choose 1) ☐ Back ☐ Side ☐ Stomach ☐ Back & Side  
☐ Other (specify) \_\_\_\_\_

	1 (least)	2	3	4	5 (most)	Don't know
b. How strongly did they recommend this sleep position to you?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. How much do you trust this person's advice?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d. How important was this advice to you in making your final decision about how to place (NAME) to sleep?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

e. Comments: (text box)





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## 5. DID YOU GET ADVICE FROM NURSES ABOUT WHAT POSITION (NAME) SHOULD BE PLACED TO SLEEP?

- ☐ Yes
- ☐ No (skip to Q#6)
- ☐ Don't know (skip to Q#6)

a. Overall what sleep position did they recommend? (Choose 1)

☐ Back ☐ Side ☐ Stomach ☐ Back & Side ☐ Other (specify) \_\_\_\_\_

	1 (least)	2	3	4	5 (most)	Don't know
b. How strongly did they recommend this sleep position to you?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. How much do you trust this person's advice?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d. How important was this advice to you in making your final decision about how to place (NAME) to sleep?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

e. Comments: (text box)

## 6. DID YOU DECIDE HOW TO PLACE (NAME) TO SLEEP BASED ON YOUR OWN OPINION ABOUT SLEEP POSITION?

- ☐ Yes
- ☐ No (skip to Q#7)
- ☐ Don't know (skip to Q#7)

a. Overall which position do you feel you should place (NAME) to sleep? (Choose 1)

☐ Back ☐ Side ☐ Stomach ☐ Back & Side ☐ Other (specify) \_\_\_\_\_

	1 (least)	2	3	4	5 (most)	Don't know
b. How strong is your opinion about this sleep position?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. How much do you trust your opinion?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d. How important was your own opinion in making your final decision about how to place (NAME) to sleep?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

e. Comments: (text box)





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7. HOW LIKELY IS IT THAT ANY ONE OF THE FOLLOWING INDIVIDUALS WOULD BE ABLE TO CONVINCE YOU TO CHANGE YOUR OPINION ABOUT THE BABY'S SLEEPING POSITION? (PLEASE SHOW LAMINATED CARD)

	1 (least)	2	3	4	5 (most)	Don't know
a. Family:	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b. Friends:	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. What I saw the staff do in the nursery at the hospital	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d. What I learn from tv, radio, magazines, newspapers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e. What I learn from doctors	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
f. What I learn from nurses	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
g. What I learn from community members (like teachers or clergy)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>





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D. Demographics: I have a few more questions for statistical purposes ONLY.

1. Is (NAME) your first child

- ☐ Yes (Skip to Question #4)  
☐ No  
☐ Not applicable

2. What are the ages of your other children? (years)

1.

3.

5.

2.

4.

6.

3. Did you ever place the other children on the stomach to sleep?

- ☐ Yes  
☐ No  
☐ Don't Know  
a. If yes, why did you choose that position? (Check all that apply)  
☐ Advice of health care provider ☐ Experience with other children  
☐ Advice of mother, grandmother ☐ Other (Specify)  
☐ Advice of friend ☐ Don't know \_\_\_\_\_  
☐ My own instinct

4. Has your current opinion or practice about sleep position changed from what it used to be?  
(Most recent if changed more than once)

- ☐ Yes  
☐ No (skip to Q#5)  
a. ☐ Before (NAME) was born  
☐ After (NAME) was born, if after specify when:

b. What was the change?

c. Why did it change?

5. Was (NAME) born more than three weeks before his/her due date?

- ☐ Yes  
☐ No  
☐ Don't Know





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6. Is (NAME) generally healthy?

☐ Yes (skip to Q#7)

☐ No

a. If no, what are (NAMES) medical problems? (Check all that apply)

☐ Asthma

☐ Prematurity

☐ Other (Specify) \_\_\_\_\_

7. What is the highest grade or year of school that you completed? (DO NOT READ LIST)

☐ Eighth grade or less (grades 0 - 8)

☐ Some high school (grades 9 - 11)

☐ High school graduate or GED certificate (grade 12)

☐ Some college

☐ College graduate

☐ Post graduate or professional degree

☐ Refused

8. How old are you?   years

9. Do you consider yourself hispanic/latina?

☐ Yes

☐ No

10. Which of the following BEST describes your racial or ethnic background? (READ LIST)

☐ White (caucasian),

☐ (black), African-American

☐ Asian/Pacific Islander

☐ Native American

☐ Multi racial (do not read) (Specify) \_\_\_\_\_

☐ Other (Specify) \_\_\_\_\_

☐ Refused (do not read)

a. Where were you born? \_\_\_\_\_

☐ USA (Mainland)

☐ Puerto Rico

☐ Outside USA

11. Do you smoke?

☐ Yes

☐ No





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12. Does anyone who is around (NAME) smoke?

☐ Yes

☐ No

13. Did you/the mother of (NAME) smoke before pregnancy?

☐ Yes

☐ No

a. If yes, did you/she quit during pregnancy?

☐ Yes

☐ No

14. Where does the baby currently receive well care?

☐ Hospital based clinic

☐ Freestanding clinic

☐ Private practice

☐ Other (Specify) \_\_\_\_\_

☐ None

15. What is the name of the hospital where (NAME) was born? \_\_\_\_\_

Discuss SIDS recommendations with respondent using pamphlet. Give respondent pamphlet and 800 number for reference.

Thank respondent, allow for questions, comments, etc.

Comments Made? ☐ Yes ☐ No (If yes specify below)

NOTES ABOUT THIS INTERVIEW:

Please review CODING for this interview ☐ Yes ☐ No

Please fax this form using the teleform fax number (617) 638-5259

Faxed: \_\_\_\_\_



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